

# Bachelor of Science in Electrical Engineering Concentration in Biomedical Applications

The Michigan Tech Department of Electrical and Computer Engineering is pleased to offer a **Concentration in Biomedical Applications**, within the degree Bachelor of Science in Electrical Engineering.

This concentration is intended for those students whose primary interest is in electrical engineering, and who seek to apply their skills in the healthcare field. Examples of such applications include biomedical instrumentation, biomedical signal processing, and medical imaging.

Students enrolled in the concentration will take a number of required and elective courses in biology, anatomy, and biomedical engineering, and will have the opportunity for capstone design projects in cooperation with the Department of Biomedical Engineering.

The BSEE Concentration in Biomedical Applications will open career possibilities to electrical engineering graduates who have a focused passion for human health and well-being.



To complete the BSEE with a concentration in Biomedical Applications a student must include the following coursework:

BL 2010 Anatomy and Physiology I	3
BL 2020 Anatomy and Physiology II	3
BE 2400 Cellular and Molecular Biology	3
BE 3700 Biomedical Instrumentation	3
BE 3701 Biomedical Instrumentation Lab	1

Focus Area: <b>Choose One</b>	3
BE 2800 Biomaterials I: Fund. of Matls Science and Engrg	
BE 3300 Biomechanics I: Statics and Dynamics	

Electives: <b>Choose One</b> (if not chosen above)	3
BE 2800 Biomaterials I (not chosen as Focus Area above)	
BE 3300 Biomechanics I (not chose as Focus Area above)	
BE 3350 Biomechanics II: Soft Tissue and Bio-Fluid Mechanics	
BE 3800 Biomaterials II: Properties and Biological Interactions	
BE 4250 Biomedical Optics	
BE 4610 Biological Microscopy for Engineers	
BE 4770 Biomedical Microcontrollers	
BE 4700 Biosensors: Fabrication and Application	
BE 4755 Medical Devices	

Total credits 19

Michigan Technological University

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Michigan Tech

## Bachelor of Science in Electrical Engineering Biomedical Applications Concentration (19 cr) Biomechanics focus

*This suggested plan applies to students entering in Academic Year 2016-2017 who are ready for calculus.*

<b>Semester 1</b>			<b>Semester 2</b>		
CH1150&1151	Univ. Chemistry I & Lab I	4	PH2100	Univ. Physics I - Mechanics	3
CH1153	Prob. Solv. Chem. I :optional	1	ENG1102	Engineering Modeling & Design	3
ENG1101	Engineering Analysis	3	MA2160	Calculus with Technology 2	4
MA1160 <sup>1</sup>	Calculus with Technology 1	4	PH1200	Univ. Physics II Lab	1
PH1100	Physics Lab 1	1	EE1110	Essential Math for EE's	1
UN1015	Composition	3	EE1111	Intro. to Elec. & Comp. Engg	1
			UN1025	Global Issues	3
Total		<b>15/16</b>	Total		<b>16</b>
<b>Semester 3</b>			<b>Semester 4</b>		
MA2321 <sup>2</sup>	Linear Algebra	2	EE2112	Electrical Circuits II & Lab	4
MA3521 <sup>2</sup>	Differential Equations	2	MA3160	Multi-variable Calculus	4
EE 2111	Electrical Circuits I	3	BL2020	Anatomy/Physiology 2	3
CS1111	Intro to Programming in C/C++	3		Critical & Creative Thinking crse <sup>6</sup>	3
BL2010	Anatomy/Physiology 1	3		Soc. Resp. & Eth Reasoning crse <sup>6</sup>	3
BE2400	Cellular & Molecular Biology	3	Total		<b>17</b>
Total		<b>16</b>			
<b>Semester 5</b>			<b>Semester 6</b>		
EE 2174	Digital Logic and Lab	4	EE3901	Design Fundamentals	2
EE3131	Electronics	4	EE3171 <sup>9</sup>	Microcontroller Applications	4
EE3160	Signals and Systems	3	BE3700&3701	Bio-Instrumentation and Lab	4
PH2200	Univ. Physics 2-Elec&Magnet	3		BEA concentration elective <sup>7</sup>	3
BE3300 <sup>3</sup>	Biomechanics I	3		HASS HU/FA elective <sup>6</sup>	3
Total		<b>17</b>	Total		<b>16</b>
<b>Semester 7</b>			<b>Semester 8</b>		
EE4901 <sup>4</sup>	EE Design Project 1 (part 1)	2	EE4910 <sup>4</sup>	EE Design Project 2 (part 2)	2
EE3180 <sup>9</sup>	Probability – Signal Analysis	3	EE3140	Electromagnetics	3
EE3261	Control Systems	3	EE3250	Intro. Communications Theory	3
	EE elective <sup>5,7</sup>	3		EE elective <sup>5,7</sup>	3
	2 <sup>nd</sup> Comp/Comm. Course <sup>6</sup>	3		HASS elective <sup>6</sup>	3
	HASS EC/PSY/SS	3	Total		<b>14</b>
Total		<b>17</b>			
Total			<b>128 Credits</b>		

Students must add 3 units of co-curricular activities (Physical Education), usually taken in six .5 units.

Follow pre-requisites and semester offerings. This is a 'suggested' plan which can vary by individual student. Students who begin in a pre-calculus course will take ENG1001 and ENG1100 in place of ENG1101 in first year.

1. MA1160 may be replaced by MA1161.
2. MA2320 and MA3520 may replace MA2321 and MA3521.
3. Focus: Choose BE2800 Biomaterials 1, (taken in sem 6) or BE3300 Biomechanics 1 (taken in sem 7).
4. Approved Enterprise courses or BE4901 & BE4910 may replace EE4901 & EE4910. See department advisor for details.
5. EE Electives: 6 credits of EE courses not listed here and not EE3010, EE3805, EE4000, EE4805, EE4901, EE4910.
6. HASS = Humanities, Arts and Social Sciences. Follow university requirements for general distribution electives.
7. Credits may be double-counted toward an ECE accelerated master's program. Must be "EE" level 4000+ credits.
8. BEA conc. Elective – Choose one: BE2800, BE3350, BE3800, BE4250, BE4610, BE4700, BE4755. May switch to fall.
9. May use BE4770 plus 1cr. free elective in place of EE3171. Students may NOT substitute BE2110 for EE3180.